FAA Unmanned Aircraft Systems (UAS) Update

Presented to: The National Academies UAS Risk Studies Meeting

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Date: September 26, 2017
Overview

• **Why Are We Here**

• **Understanding the Environment**
  – Challenges
  – Legislative Requirements
  – Priorities and Strategies
  – FAA Approach to Risk
  – Research Alignment and Partnerships

• **Ongoing Work**
  – Standards Activities
  – LAANC & UTM
  – UAS ID and Tracking ARC
  – Other Stakeholder Activities
Why Are We Here

• FAA Extension, Safety, and Security Act of 2016, Section 2213 – Probabilistic Metrics Research and Development Study
  – “…the Administrator of the Federal Aviation Administration shall enter into an arrangement with the National Academies to study the potential use of probabilistic assessments of risks by the Administration to streamline the integration of unmanned aircraft systems into the national airspace system, including any research and development necessary.”
The Challenge

Industry Volume & Pace

Shared Commitment to Safety

Innovation

Collaboration

Personal Nature of UAS
Volume Indicators

Total Remote Pilot Certificates Issued: 62,340
Total Knowledge Exams Passed: 43,835
Knowledge Exam Success Rate: 92%

Top 5 Waiver Requests

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Night Operations</td>
<td>70%</td>
</tr>
<tr>
<td>Operations over People</td>
<td>32%</td>
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<tr>
<td>BVLOS Operations</td>
<td>17%</td>
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<tr>
<td>Operational Limitation: Altitude</td>
<td>10%</td>
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<tr>
<td>Operations from a Moving Vehicle</td>
<td>8%</td>
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Airspace Waivers/Authorizations Approved

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<thead>
<tr>
<th>Class</th>
<th>Approved</th>
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<tbody>
<tr>
<td>Class B</td>
<td>1,087</td>
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<tr>
<td>Class C</td>
<td>1,667</td>
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<tr>
<td>Class D</td>
<td>4,471</td>
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<tr>
<td>Class E</td>
<td>781</td>
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<tr>
<td>TOTAL</td>
<td>8,006</td>
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Reported UAS Sightings
Legislative Activities

- FAA Extension, Safety and Security Act – Public Law 114-190
  - Section 2202 – Remote ID Standards
  - Section 2206 – Airport Safety and Airspace Hazard Mitigation Pilot Program
  - Section 2208 – UTM Research Plan
  - Section 2209 – Restrictions over Fixed Site Facilities
  - Section 2211 – UAS Research Roadmap
  - Section 2212 – UAS Collision Research
  - Section 2213 – Probabilistic Risk Assessments
FAA UAS Priorities

Address Security Concerns

Automate Systems

Continue Expanding Operations
The Path to Full Integration

Airspace Access

- Large UAS / high energy output
- Small UAS / low energy output

Full UAS Integration

- NAS System Integration
- Small Cargo / Passenger Operations
- Non-Segregated Operations
- Expanded Operations
- Rulemaking to Address Security Concerns
- UAS Operations Over People
- Part 107 Operations
- Operations by Exemption

Regulatory Framework

- Online Registration
- Low Altitude Authorization & Notification Capability (LAANC)
- Aeronautical Information Infrastructure for UAS

Within VLOS / isolated operating area

Beyond VLOS / populated operating area

Federal Aviation Administration
www.faa.gov/uas

National Academies
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**Rulemaking Approach**

- **Increasing Operator Certification**
  - >12,500 lbs. (Global Hawk)
  - >2,000 lbs. (Predator)
  - >1,000 lbs. (Hunter)
  - <55 lbs. (Scan Eagle)
  - <4.4 lbs. (3DR Solo)
  - <2.5 lbs. (DJI Phantom)
  - <1 lbs. (Parrot Bebop)
  - <0.5 lbs. (Hubsan X4)

**Society’s Demand for Safe Outcomes**

- **Societally Accepted Risk & Desire for Low Cost**
  - Zero Risk
  - No Operations
  - No Innovation

**Public Demand for Safety Assurance**

- Less Demand
- More Demand

**Absolute Safety**

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System Safety – the Safety Continuum

Too little rigor…
- Safety escapes
- Fatal accidents increase

SEEK
- Establish appropriate balance in our regulatory approach
- Achieve safety objectives while imposing the least burden on society.

Too much rigor…
- Innovative safety enhancements don’t reach the fleet
- Finite dollars that could be spent on safety enhancements go elsewhere
- Fatal accidents increase

Risk of accidents due to lack of safety innovation

Risk of accidents due to inadequate safety program

Total Risk
UAS Collaboration & Partnerships

- AFRL: Air Force Research Lab
- ANSI: American National Standards Institute
- ASEB: Aeronautics and Space Engineering Board
- ASSURE: Alliance for System Safety of UAS through Research Excellence (FAA’s Center of Excellence for UAS)
- ASTM: American Society for Testing and Materials
- CAASD: Center for Advanced Aviation Systems Development
- CTA: Consumer Technology Association
- EASA: European Aviation Safety Agency
- EXCOM SSG: Executive Committee Senior Steering Group
- FAA CAMI: Civil Aerospace Medical Institute
- FAA WJHTC: William J. Hughes Technical Center
- ICAO: International Civil Aviation Organization
- IEEE: Institute of Electrical and Electronics Engineers
- JARUS: Joint Authorities for Rulemaking on Unmanned Systems
- NIST: National Institute of Standards and Technology
- NSF: National Science Foundation
- SARP: Science and Research Panel
- TRB: Transportation Research Board
FAA UAS Standards Development Efforts

- **American National Standards Institute (ANSI) UAS Standards Roadmap**
  - Identify UAS standards requirements
  - Identify standards development efforts that are complete
  - Identify standards development efforts that are in progress
  - Identify gaps and identify potential Standards Development Organizations to fill the gaps

- **UAS Major Standards Development Activity**
  - RTCA SC-228
    - Working Group 1 – Detect and Avoid
    - Working Group 2 – Command & Control
  - RTCA SC-147
    - Traffic Alert & Collision Avoidance
  - ASTM
    - F38 – Design, Manufacture & Maintenance
  - CTA-2063
    - Small UAS serial numbers
Low Altitude Notification & Authorization Capability (LAANC)

Goals
- Enable efficient Part 101/107 notification and authorization services to small UAS operators
- Provide the data exchange framework for UAS traffic management (UTM)
Managing Airspace Access – UTM

Air Traffic Management System
Established policies & procedures

UAS Traffic Management System
Cooperative interaction

HALE = High Altitude Long Endurance

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Operations Over People
Media Coverage
Small Cargo
Agricultural

Border Protection Monitoring

Model Aircraft
Commercial UAS
Non-towered Airport
Infrastructure Inspection
UAS ID & Tracking ARC Overview

• **UAS over people raises safety and security questions**  
  – Technological failure, accident, or malice  
  – Increases challenge for threat discrimination for security partners

• **Working with Federal, State, and Local Defense and Law Enforcement partners**  

• **ARC will develop recommendations for remote UAS identification and tracking (2202)**  
  – Membership is diverse – aviation, technology, law enforcement, and safety stakeholders
Stakeholder Collaboration

Drone Advisory Committee (DAC)

- **Purpose**: help prioritize the FAA’s UAS integration activities
- 35 members
  - UAS manufacturers and operators, traditional manned aviation, labor organizations, radio and navigation equipment manufacturers, airport operators, state and local officials
- Subcommittee + 3 Task Groups
  - Roles and Responsibilities
  - Access to Airspace
  - UAS Funding

Unmanned Aircraft Safety Team (UAST)

- **Purpose**: gather and analyze data to enhance safety and operations of drones in the nation’s airspace
- 48 members
  - Primarily UAS manufacturers, operators, and data service providers, as well as traditional manned aviation groups
- 6 Working Groups
  - UAS Survey
  - UAS Data Management
  - UAS Communications
  - UAS Loss of Control
  - Injury Reduction
  - Safety Culture
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